Notebook, N-89-06-21.2

This notebook covers the period June-November 1889. It was used by Reginald Fessenden and Alex W. Brigham for notes on experimental projects and various other tasks in the chemical laboratory. There are also entries by Fessenden regarding structural alterations made to the chemical laboratory. The front cover is labeled "Alex Brigham #555." The spine is labeled "93." The pages are unnumbered. Approximately 50 pages have been used.

XE-172 N-89-06-21.2

#555

M. Fessenden

June 21-89

F. H. Bugbee

June 21, 89.

4 grams [illegible] in 1 c.c. also the acid & [illegible] 1 of [illegible] 100, add & heat in 4 or 5 hours with 1. alcohol. 2. CS$_2$. 3. Impure [illegible] ~~& [illegible]~~ filter & wash filtrate down [illegible] mass.

Get shell iron for stoves, furnaces etc.

Jun 22

A Ammonia for iron etc. ✓

B Find out what Hall's alloy was for free cole in charcoal. ✓

C Get shell iron cut out & worked. ✓

D Dissolve some NaOHO in CS$_2$ ✓

E. 7 mch. coal, ~~[illegible]~~ steam & SiO$_2$ ~~[illegible]~~ in 2 dish & 2 Na HO in mch. ✓

F Made samples of [illegible]

1 Clay to 1 Pond Brick

1 " " 2 " " 4 "

A [illegible]

June 22nd

A [illegible] Pb(NO3) [illegible] Tray Dice and Steam
[illegible] 5 lbs NH4Cl 10 [illegible]

B [illegible] 1 lb [illegible] in least quantity
[illegible] 10 lbs NH3 in 10 [illegible]

C [illegible] 1 lb [illegible] with 1/2 lb [illegible] OH.

D Get [illegible] of cells & [illegible] in pieces as big as 100 grams except [illegible] & also [illegible] of charcoal [illegible] 5 feet.

E. Hello

A going on Paraffine [illegible] renewed
B. OK
C OK
D OK
E
F - OK.

24th

A - OK [illegible]
B - All mixed ready to boil
C OK
D - OK
F - ~~[illegible]~~
Chlorine generators going all day no [illegible] of yet

June 25.

A. Dissolve Peanut soap with dil HCl. Take fatty acids & let them drain & give a fatty class.

B. Try Edison's idea again. 1st for 10 minutes, 2nd - 20 min. 3 for. 30 min. 4 for 1 hour, filtering & with CS, nothing could time as soon as you have finished.

C. Take oil, heat to 100 & distill the Paraffin & melt it & compare by melting point.

D. ~~Distill~~ Take 5 litres dimethyl sulphate & pass gas through cold.

E. Take 50 litres Benzoic acid & permanganate put & heat away in bottle for fortnight. Bottle & bottle cold & dry in oven. Test benzoic acid.

June 26

1 A. Throw away peanut soap & stearic acid & repeat, weighing 5 lbs of oxygen not same.

2 B. Repeat Edison's idea. & telling me each time before you pass the gas through & cooling better after each time.

3. C. Get box cells from Thomas Noble.

4 D. ~~Distill~~ fire 5 litres of clay sample to the best.

5 E. Try permanganic acid (Water through Castle oil ~~[illegible]~~ 410 minutes.

Wm.

6/25

A. ~~Brought~~

B. 1st 2nd + 3rd OK

C. OK.

D. Going on

E. ~~[illegible]~~

a. Not finished

B. Not Finished.

C. OK

D. Not Finished.

E. Not Done.

E Put 1 lt qts & green lamp cord & rest of cabinet on back column.

F. ~~[illegible]~~ Fill & Tumble with water & int. each of them pot = help a as I have a bouncing matter bottle thing

E. Make up fluoride solutions. 10 l. in tumblers

H & F put some chains & strong paper in H Fl qts.

$1. 2. 5' & rest.

June #27

~~Subject~~ Finish work for June 26.

I. Try classic cin without cylinder of calcium tube with catch for water. #5. 10. 30

June 28.

A. Put strong paper in Fluoride solutions.

B. Try classic with 2nd and of other dr. & shake starch up first.

C Fire day bells.

E ~~Sub~~

F ~~Sub~~

G ~~Sub~~

H. ~~Sub~~

28

H done ✓

O OK ✓

F OK ✓

E OK ✓

D. OK ✓

B. OK ✓

Sub's one.

OK

Sub done!

D. B otte ulmic acid & put part in Ammonia.

E. ~~Treat a little~~ Dissolve a little in ammonia & evap down in vacuo.

F. Filter crystals acid.

June 29

A. Put H2O2 in Ed. Gum che & stand up.

B. Tow shake ether & with castor oil & with Olive oil. stand stream for ~~hour~~ two minutes. of ether down. Then it will right up. in run Then half run. we cross of stands always. Tests positives as much as poss. c

C. ~~Filter up~~ Crystallize acid in pen & ~~water two~~ see if it ~~separates~~ Tiny.

N.

OK

half done.

OK.

OK. two minutes.

~~June~~ July 1.

1. a. Wash up of chlorine.

4 B. Tray clean in an Iron vat for ½ min. then till it strongly heated, then cold water.

3 C. Fuller's linseed soap & wash either over weak bath in stream of CO_2

2 D. Wash up. Sperrin 100 oz

Boracic acid	5 oz.	11 X
Ammon alum	5 "	2 —
Soda alum	5 "	3 X
Ammon Carbonate	5 "	4 X
" Chloride		5 X
Tartar emetic		6 —
Barium chloride		7 —
Copper Sulphate		8 X
Mercuric chloride		9 X
" cyanide		10 X

~~1/2~~ a. 0/6

B. "

C. "

D. "

E Made Recovery and soap.

July 22nd

A. Any class is cut with caustic till heated & then cool

B. Evap. [illegible] from skin, in [illegible], since also how [illegible]. Hand Test.

C. No examples of fire clay.

D. Dry up room 3 & room outside

E. Boil the bits for two hours in caustic soda, then wash in water, & put in HCl 1 pts. When 1 pt. water 10. When tests ok & [illegible] will till probably. Wash to neutral point. So must be very clean & bright.

July 2nd

A - OK

B -

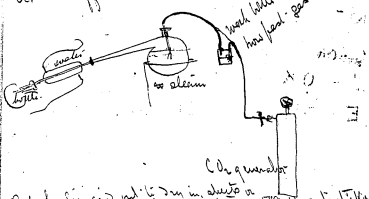
C - OK

D - OK

E - Boiled in Alkali

July 3rd

A. Boil 15 ethan stems.



B. Pt. [illegible] gas pot. is sig in. shute to [illegible] stems [illegible] food. Passing air through [illegible] to gelatin stillage
B. Try electric air for well then elec. d. heat up. Thin hot & help passing gas [illegible] for [illegible]

C. Air only Kept passing gas in for 5 min.

D. Still hot for three hours.

Blank on electrify calcium tube in any of these

E. Finish water.

F. Pass enough through solution.

A – OK
B – OK Brown
D – NO
G – "
E – OK
F

July 5th

A. Fill Chlorine Generator. — Done.

B. makes solutions on Saturday

1/9 Sodium Chloride

" " Carbonate — Finish

" " Sulphate

" " Soda.

" " Potassium

" Borax

C. Try Ulmer oil for electric same as yesterday. — Not done.

D. Fill chlorine generator & connect to to all bottles — Done.

E. Gives up 5 lbs Cal. Theale. — Not done.

July. 8.

A. Grass wp. C. 4.1. 12 Ds f.t.

B. Yr Sine ok. to divide. some so early.

C. Very poor solutions for mixture.

D. Inconvenient steps in exam.

E. Heat day bells already in most f.t. i well det.

F. Ivy and a few or 2 Ds.

July 10

A. Ty divide with Sine ans.

B. Wks Sol. 1 ll, Ammonia m

C. Examin test tubes. & put some all.

F. Put through that was in H.Q. to Dr & Mrs
put in Chlorofom & chloral. t' ex of Dr Dos Rios.

G. M.T. qtr

A Wrong

B Wrong 4 g Chlorid. 5 cwt 10 water L. @ 150 cc Dim ad.

C. —

D. —

E. Heat day seems the best

F Wrong, —

July 10

A - OK. —

B -

C. -

July 11.

A. Make up solutions.
1. Sod. Carb.
2. Barium Carb.
3. Bicarb. Soda.
& electrolyze.

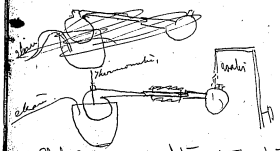
B. Chlorinize 2 lbs Paraffin.

C. Try distill air again.

July 18.

A. Freeze liquid air.

Best Goodness.



& effect what comes over between temperature of air & F.O.F. 80-100. 100-150. 150-212. 212-

A Done

B Done

C. Done

July 23

A) Make soup for Ch. Gen.

B) Clean Rooms

C) Pulverize some charcoal and [illegible] some

D. Boil down some Gem Wells

E) Take flasks etc out of Chromic Acid Wells and put in the fresh ones

F) Fill up Steam and Solar Tanks

G) Pulverize some New Ore

July 23

A) Done

B) Done

C - Done

D - Done

E - Done

F - Ad done

G - About 6th

July 24.

A. Trickle up all not very expensive solutions.

B. Also of Sodium Chloride & from Potassium Iodide also in 3 tubes

C. Grind up 5 acid from stoccoma & also of dissolved & found of.

D. Saponify chloric acid with NaOH

July 25

A. Sodium wires off & heated. Burn. Put fresh wire in & leave for week

B. Saponify chloric acid. Heat - cool & hold then pour in Ether and.

C. Saponify chloric acid. Do same to Iodic

D. Test sulphur & see how pure as hot through it.

E. Break up all like to 1" pieces & conform

F. Varnish & O through some Carbon

Sm

Sm

Sm

Sm

A Done

B

C

D

E

F Done

Final Survey [illegible]

A. [illegible] awarded units Neat & quality [illegible]

B. [illegible]

C. [illegible] chronological [illegible] e. [illegible]

D. Pat. Sulphate Cu. [illegible] in class. [illegible]

[illegible] Ursalic [illegible] till readers [illegible] paper [illegible] & pat. [illegible] [illegible] in pat. [illegible]

E. Heat [illegible] in [illegible] [illegible] [illegible]

[illegible] sulphur in [illegible]

J. Stone

C. Stone

F. Stone

E. Stone

Finish all work in Room 3 upstairs, except of course when necessary to do it downstairs. Keep up Room 3 as neatly as you can.

1st Clean all shelves. Dust them off. Put everything in order.

2. All iron apparatus that is rusty or otherwise not in good condition, repair, varnish or paint.

3. Paint inside of hood, & see that burner up chimney works all right.

4. Wipe off all bottles & see that labels are all right.

5. Prepare 1 quart of marking ink (p. 200. Chem. Rec. Bolt) & put away in bottle. Use for labels &c.

6. ~~Take the carmalose pot & brush. Clean pot.~~ Take quart bottle & brush, small. & fill bottle with shellac in wood spirit. & pass brush through tightly fitting cork, so.

Also for coating labels.

7. All things got from storeroom must be got through Mr. so that can enter them in his book.

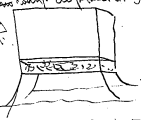
Do all these experiments in the order I have put them down in mind on before going on to the next. That is iron wire must be finished, that is the most important. Yes & so it will probably be which we avoid.

Sat July 26

1. OK
2. "
3. "
4. "
5
6 OK
7 OK

8. Go ahead with oxidizing iron wire experiments.
I think the best will be
Do all these experiments whether you get good results from the first ones or not. I want just as many results as possible. Probably just what we want.

A good way must be got.



Page 412 Chem Rec Bk

Take small oven, put in bottom two 1 inch coke, then on top piece of clean iron, lying on wire netting coarse 1/2 inch above coke. Heat bottom till red hot & coke gives off no more vapours. Then the iron should be covered with black insulating coating not easily rubbed off. Try several times and if you succeed put iron wire very clean, sand papered, & try it.

9. Make a sol. of copper sulphate acid. Put clean iron wire in till good firm coating on it. Then cover with sod. sulphide & let dry. once or twice.

10. Ditto but ~~cover~~ after coppering the wire tin it well & if ~~in~~ sod. sul. does not blacken pass through melted sulphur quickly or slowly.

11. Boil iron wire in linseed oil till acrolein comes off for 1/2 hour. thin layer. Then take out & heat red hot.

12. Also try new process bronze on iron KNO_3 & HCl; also acetic. page 414 Chem Rec Book

Try several times. probably good.
But always clean iron well in all experiments.
~~Heat~~

8 - OK

9 - OK

10

11 OK

12 OK

12a. Fill ~~the~~ gas blow pipe. If gas supply is not in least quantity in water. When gas is on to tell him to prepare it for fresh by exhausting & boil away, but not to dilute. When dilute it is ready to only allow it to be put on the ~~[illegible]~~ fresh, do not heat it at all but put more wine in it & heat, were gas hot till fresh forms on wine, then take wine out & heat gas hot in air. If it is not still, heat gas hot in centre air ~~[illegible]~~ before heating in wine oil.

13. Present all ~~[illegible]~~ tin canisters up stairs & see that the labels are clean. Fill up all pressure bottles etc.

14. Fill brass mortar for all three labs.
do — — — kg. nitro glycerin in small bottles
also put glycerin in alphabetical order.

15. Go through all drawers throughout, put all stuff that the men cut in tin cans & boxes & label.

16. Make special shelf for all chloroform products put in dark bottles & label well.

17. Clean out chloroform generators in room 3. very dirty. be careful about glass tubes etc there. Nothing must be left on the floor. Room in difficulty operations after cleaning it.

18. Fill in water with stuff so that it doesn't leak.
& fill crucibles with stuff for ~~[illegible]~~ cleaning dishes
1. Dry. 2. HCl. 3. Distil water put. 4. Burn off it.

12a OK
13 OK
14
15 OK
16 OK
17 OK
18.

19. 3 in up steam ~~[illegible]~~ sulphur 3 ft flow.

20. 7 in up all ~~[illegible]~~ empt. 3 also on shelves. Have that been stuff in them & pleasure. Keep. Those that are 3 into out. 2 on shelf. Throw away or clean. ~~[illegible]~~.

21. Pull 2 steam bottles from autoclave room to the rubber connections. 20

I have spoken to Mr Ott about cutting them keep steam stuff. If he has rubbers above, put it in place of one of the bottles.

22. 7 in up connections to Wilmington gauge. Up on that then both disconnected: wooden and glass distinctly another.

23. Pick up all burners. so that the bright burners remain perfectly clean. Mr Bettert & Mr. Mr Bottle & those upstairs & those in room 20.

24. 1 oz. 1 part. B solution in dark graduates CS2 then 1/100 N/10 Sulphur in ~~[illegible]~~ CS2 in 2 same amount of CS2 that bottle is placed in. mix by shaking & decinormate

25. Try Mercuric solutions for cutting the irons. Hg in alcohol & then heat air dry in air. Ether in alcohol 95 etc.

26 Try iron carbonate mixed to thin paste with linseed oil and heated red hot.

14. OK
20 OK
21 OK
22 OK
23 OK
24 OK Calatory
25 OK
26 OK

Oct. 14, 89

A. Boil paraffin (Chas) down with water till no longer tastes acid.

B. Fill Chlorine generator & start up in the atomic acid. Then will help you. R

C. Fix the steam pipe, the clock, & if you have time to spare, the lamp-stand are about circular

D. Melt 4 oz paraffin & put into 2 oz powder chloride of Antimony.

E. Will show you Chart. S + Pud. etc.

F. see if chloroform & ether dissolves in

A. 1 pt. camphor & 1 pt. chloral.

B. 1 pt. Dimecamph.

A. Done

B. OK

C. Fixed steam pipe & Clock

D. OK

E. OK

F. Dissolves quite readily in both

A. Pass chlorine into this crucible, but first melt the flinds by passing SO₂ into the glass tube in at same time.

B. Heat after treating with nitric acid till the black turns to red.

B. Salt water + then rub hard.

C. Hypochlorite of soda.

D. Hypochlorous acid.

Last time red coating scales off

Bottle 1 B Chloride of Antimony &
2 B HCl of specific gravity 1.2. then
dip wire in, very clean. B Cl. if that is sound-
sound. put after this iron first & then dip in
the antimony.

C. Tartar emetic. ~~Pot.~~ ~~1 B~~ 4 B
HCl. ~~Pot.~~ 2 B } Inside
Water 1 B.

& plate the wire for three hours.

Cl. Take a glass of lemon of HCl & have
piece of zinc in it & put in iron wire
very clean after then put wire in bottle of
clean wire well dipped in bottle }
Potio chloride of tin 2 1/2 gms } bottle 1/8 of
Ammonia chlor 7.5 gms } all.
Water 5000 gms.

till some deposit of tin forms.

A. Make up solutions of coppering, tinning & antimoniating. Clean pieces of iron 6" by 3. & call me.

B. Tin & copper two pieces 6"x3" in dipping bath.

C. Fix drip pipe.

D. Put acid in generator.

E. ~~Fix light~~ Get left iron over from store room & varnish.

F. Heat sand bath hot & call me.

Generator running better than it ever ran before.

A. Made coppering solution now

B. not done

C OK

D OK

E Helper. Store

H Tended to chlorination

No. 5th

A. ~~Use~~ Make up an all cyanide copper bath. 1 g cy to 4 water. dip iron in it for preliminary coating. If the bath is not alkaline, make it so. When the first coating is very delicate, it will in another of copper bath. a very slight current, or. no need to make a cyanide. Acids any copper wont plate from from acid bath but must have film first as in alkaline bath first.

B. same as yesterday. When film on, put in acid bath + take + pass H_2S over them for 5 mins. in cell bell.

C. Bath with as galvanizing iron iron but heat slightly hotter.

Nov 5th

A Cy amide copper is not soluble in H_2O, KCy, Ammon, + Caustic alkali

B Not.

C Heated Solution Sodium wire in tube passed H_2S for 20 min dark colored precipitate formed on over side time. now continue aq air Heated better equal to s

Nov 9th

A. Filled chlorine generator B

B from water vine.

Nov 10th

A. Filled generator.

B. Unfurnished wine passed through at the rate of a for per minute generally good but in some places cracked off. (8)

C.

Nov 17th.

A. Chem pulls.

B. Fire of resistance cable from up stairs.

No. 15

Made samples in

Asbestofoam	1	Asbestolin	1
"	2	"	1
"	3	"	1
"	1	"	2
"	1	"	3